higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

FITTING AND TURNING L3

7 December 2020

This marking guideline consists of 6 pages.

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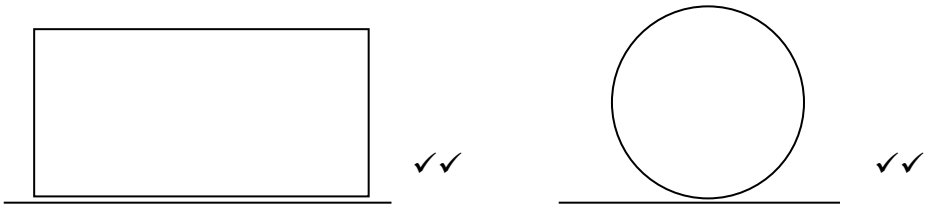
QUESTION 1: BEARINGS

1.1
- Friction/Plain/Journal bearing
- Antifriction/Rolling bearing (2 ×1) (2)

1.2
- Contamination with dirt and foreign matter
- Abnormal load due to improper assembly
- Shaft and housing fits are too large or too small
- Improper lubricant or lubrication method
- Improper design or poor quality of shaft and housing
- Errors in selection of bearings (Any 5 × 1) (5)

1.3
1.3.1 Radial
1.3.2 Axial and radial
1.3.3 Axial and radial
1.3.4 Axial
(4 × 1) (4)

1.4



Line contact (roller bearing) Point contact (ball bearing) (2 × 2) (4)
[15]

QUESTION 2: COUPLINGS

2.1. Universal coupling (1)

2..2
A – Shaft A
B – Yoke
C – Key
D – Shaft B
E – Cross piece (5)

2.3
- Misalignment of shafts
- Use of incorrect coupling
- Incorrect or inadequate lubrication
- Excessive build-up of dirt may prevent it from adjusting
- Overloading
- Incorrect assembly (Any 4 ×1 (4)
[10]

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QUESTION 3: BRAKES AND CLUTCHES

3.1
- Brake applies immediately and automatically in case of power failure
- Fast response system (2)

3.2

CAUSE	SOLUTION
• Worn linings	• Replace the clutch unit
• Dirt or oil on the friction surface	• Clean the surface
• Faulty unit (Any TWO)	• Replace unit (Any TWO)

(2 + 2) (4)

3.3
- Noise
- Shudder
- Slipping
- Overheating
- Nonengagement (Any 3 × 1) (3)

3.4 Protects mechanical equipment from damage through overload (1)
[10]

QUESTION 4: BELT, CHAIN AND GEAR DRIVES

4.1
4.1.1 False
4.1.2 True
4.1.3 True
4.1.4 False
4.1.5 True
(5 × 1) (5)

4.2
- Better power transmission
- Availability of limited space
- Greater speeds
- In case of single strand failing, drive still takes place (4 × 1) (4)

4.3
- Driven gear can rotate in same direction as driver gear
- Distances of gears can be varied (2)

4.4
- More efficient
- Higher speed ratios
- More compact
- Longer life span
- Less likely to break down
- Less friction resistance
- Transmits high loads
- Direct power transmission
- Low radial loads on bearings of gear trains
- Positive drive, without any slip (Any 4 × 1) (4)

[15]

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QUESTION 5: PIPES, PIPE FITTINGS AND VALVES

5.1
- Use correct tools
- Make sure tools and equipment are in a good working condition
- No excessive force to connect a pipe fitting
- Use the correct size of pipe
- Ensure no leakages after completion of work
- Use personal protective equipment (Any relevant 5 × 1) (5)

5.2
- Controls flow rates
- Controls direction of flow
- Controls pressure and volume
- Acts as an ON/OFF device (Any 2 ×1) (2)

5.3
- Gate valve
- Diaphragm valve
- Pressure relief valve
- Non-return valve
- Butterfly valve
- Ball valve
- Foot valve (Any 3 ×1) (3)

[10]

QUESTION 6: CENTRE LATHE

6.1
- Finish required
- Type of material
- Type of tool used
- Diameter of work (4 × 1) (4)

6.2 $S = \pi \times D \times N$
$= \pi \times 0.01 \times 1800$✓✓
$= 56,55$ m/min✓ (3)

6.3

ADVANTAGES	DISADVANTAGES
• The chuck can hold a wide range of hexagonal and cylindrical workpieces.	• Chuck becomes inaccurate as the jaws become worn.
• Jaws are available for internal and external work.	• Chuck can only hold hexagonal and cylindrical workpieces.
• Work can be done on the end face of the workpiece.	• Not possible to correct any run out.
• Easy to mount the workpiece.	• Chuck is heavy to handle.
• Work can be bored • (Any TWO)	• Gripping power of the chuck can damage the workpiece.
	• Concentric accuracy is limited when you reverse the workpiece. (Any THREE)

(2 + 3) (5)

6.4
- Workpiece coming loose in the chuck
- Cutting tool becoming blunt or breaks
- Play between the slides on the lathe bed, cross slide or compound slide
- Lack of coolant which results in overheating
- Centre hole wearing out
- Backlash on the spindles (Any 5 × 1) (5)

6.5
- Facing
- Parallel turning
- Grooving or parting off
- Taper turning
- Drilling
- Thread cutting (Any 3 × 1) (3)

[20]

QUESTION 7: MILLING MACHINES

7.1
- Reduces friction and wear
- Washes away chips and filings
- Keeps the cutting tool and workpiece cool
- Provides a good finish
- Protects against corrosion
- Longer life of the cutting tool (Any 5 × 1) (5)

7.2
- Wear goggles and protective clothing
- Clamp workpiece securely
- Never leave machine unattended
- Ensure cutting tool is secured
- Do not make adjustments on running machine (Any relevant 4 × 1) (4)

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7.3
- Rapid (Direct) indexing
- Simple indexing
- Angular indexing
- Differential indexing (4 × 1) (4)

7.4 N = S/ π × D
= 45/ π × 0.025✓✓
= 572,96 r/min✓

f = fł × T × N
= 0.18 × 4 × 572,96✓✓
= 412,53 mm/min✓ (6)

7.5 Soluble oil (1)
[20]

TOTAL: 100

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